AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) Method of generating line properties of a signal line including generating ~~(401)~~ a frequency dependent line input impedance ~~($Z_{in}(f)$)~~ for a loop, the loop including the signal line ~~(2)~~ and a remote device ~~(3)~~, the method being characterized by:

- Generating ~~(402)~~ an absolute value function ~~($|Z_{in}(f)|$, A1)~~ from the frequency dependent line input impedance ~~($Z_{in}(f)$)~~ the function being essentially periodic;

- Selecting ~~(408)~~ at least two consecutive extreme values ~~(Max1; Max2)~~ of the same type of the absolute value function ~~($|Z_{in}(f)|$)~~;

- Generating ~~(409)~~ a frequency distance ~~(FD1)~~ based on said at least two extreme values;

-Generating ~~(410)~~ a line length value ~~(L)~~ based on the frequency distance ~~(FD1)~~ and a velocity of propagation ~~(vop)~~ for a signal on the signal line ~~(2)~~.

2. (Currently Amended) Method of generating line properties of a signal line according to claim 1, wherein the frequency distance is a mean value ~~(MV1, MV2, MV3)~~ between at least two different frequency distances ~~(FD1-FD4),~~ each of which reaches between two consecutive ones of the extreme values ~~(Max1, Max2, Max3; Min1, Min2, Min3)~~ of the same type.

3. (Currently Amended) Method of generating line properties of a signal line according to claim 1 ~~or 2~~, the method being performed as a single ended loop test and including:

- selecting a test transceiver ~~(31)~~ suitable for communication purposes;

- connecting ~~(603)~~, in a calibration process, at least three impedances ~~(9)~~ of each a predetermined value to a signal line connection ~~(5)~~ of the test transceiver ~~(31)~~;

- generating (606) frequency dependent echo transfer functions ($H_{echo}(f)$) utilizing test signals (vt_{in}, vt_{out}) and said at least three impedances (9); and

- generating (608) transceiver model values ($Z_{h0}(f)$, $Z_{hyb}(f)$, $H_{\infty}(f)$) with the aid of said echo transfer functions ($H_{echo}(f)$) and the corresponding impedance values (9), said model values including an echo transfer function ($H_{\infty}(f)$) for the test transceiver (31) with open line connection (5), a transceiver impedance value ($Z_{hyb}(f)$) as seen from the line (2) side and a product ($Z_{h0}(f)$) of said transceiver impedance value ($Z_{hyb}(f)$) and an echo transfer function ($H_{0}(f)$) for the transceiver (31) with shortcut line connection (5).

4. (Currently Amended) Method of generating line properties of a signal line according to claim 3 including storing (609) the transceiver model values ($Z_{h0}(f)$, $Z_{hyb}(f)$, $H_{\infty}(f)$) obtained in the calibration process.

5. (Currently Amended) Method of generating line properties of a signal line according to claim 4 including:

- selecting (610) a transceiver (1) for communication purposes of the same type of hardware as said test transceiver (31) in the calibration process;

- connecting (701) the loop to the transceiver (1);

- sending (702), via the connected transceiver (1), a loop test signal (v_{in}) to the line (2);

- measuring (703), via said transceiver (1), the loop test signal (v_{out}) as reflected;

- generating (704) a loop echo transfer function ($H_{echo}(f)$) for the loop (2,3);

- generating (705) the frequency dependent line input impedance value ($Z_{in}(f)$) for the loop (2,3) with the aid of the stored transceiver model values ($Z_{h0}(f)$, $Z_{hyb}(f)$, $H_{\infty}(f)$) and the generated echo transfer function ($H_{echo}(f)$).

6. (Currently Amended) Method of generating line properties of a signal line according to claim 1, 2 or 5, wherein a short loop length decision value (*dVvalue*) is estimated, the method including:

- generating, in a predetermined loop length frequency range ~~(f_1 – f_2)~~, an impedance mean value ~~(*mValue*)~~ of the absolute value ~~($|Z_{in}(f)|$)~~ of the line input impedance ~~($Z_{in}(f)$)~~;

- generating, in the loop length frequency range, the short loop length decision value ~~(*dValue*)~~ based on the line input impedance ~~($Z_{in}(f)$)~~ and said impedance mean value ~~(*mValue*)~~;

- comparing the short loop length decision value ~~(*dValue*)~~ with a predetermined threshold value ~~(*thValue*)~~;

- deciding the loop to be a short loop based on said comparison.

7. (Currently Amended) Method of generating line properties of a signal line according to claim 1, ~~2, 5 or 6~~ including:

- calculate an average attenuation value ~~(AA1)~~ for a selected set of telecommunication cables;

- estimate the length ~~(L)~~ of the short signal line ~~(2)~~;

- generate an attenuation value ~~(LA1)~~ for the line ~~(2)~~ by multiplying the average attenuation value ~~(AA1)~~ with the line length ~~(L)~~.

8. (Currently Amended) Method of generating line properties of a signal line according to claim 1, ~~2, 5 or 6~~ including:

- selecting one of the minimum values ~~(Min1)~~ of the absolute value function ~~($|Z_{in}(f)|$, A1)~~ and an adjacent of the maximum values;

- generating an insertion loss ~~(*loss*)~~ value for the line ~~(2)~~ based on said minimum and maximum values.

9. (Currently Amended) An arrangement for generating line properties of a signal line, the arrangement including

a front end device ~~(MD1; 1)~~ having connections ~~(5)~~ for a loop including the signal line ~~(2)~~ and a remote device ~~(3)~~, ~~the arrangement including~~

circuits ~~(LU1; 42,42, 43)~~ in the front end device ~~(MD1; 1)~~ for generating a frequency dependent line input impedance ~~($Z_{in}(f)$)~~ for the loop, ~~the arrangement being characterized by:~~

- a calculation unit ~~(CU1 ; 11)~~ for generating an absolute value function ~~($|Z_{in}(f)|$)~~ from the frequency dependent line input impedance ~~($Z_{in}(f)$)~~, the function being essentially periodic;

- circuits in the calculation unit ~~(CU1 ; 11)~~ suitable for:

a). selecting at least two consecutive extreme values ~~(Maxl, Max2)~~ of the same type of the absolute value function ~~($|Z_{in}(f)|$)~~;

b). generating a frequency distance ~~(FD1)~~ based on said at least two extreme values;

c). generating a line length value ~~(L)~~ based on the frequency distance ~~(FD1)~~ and a velocity of propagation ~~(vop)~~ for a signal on the signal line ~~(2)~~.

10. (Currently Amended) An arrangement for generating line properties of a signal line according to claim 9, wherein the calculation unit ~~(CU1; 11)~~ is arranged for calculating a mean value ~~(MV1, MV2, MV3)~~ between at least two different ones of the frequency distances ~~(FD1-FD4)~~, each of which reaches between two consecutive ones of the extreme values ~~(Max1, Max2, Max3; Min1, Min2, Min3)~~ of the same type.

11. (Currently Amended) An arrangement for generating line properties of a signal line ~~(2)~~ according to claim 9 ~~or 10~~, wherein the front end device is a transceiver ~~(1,31)~~ for communication purposes, the arrangement in a calibration mode including:

- a test transceiver ~~(31)~~ connected to a measurement device ~~(32)~~;

- the measurement device ~~(32)~~ being arranged to generate, in a calibration process, calibration values for the transceiver ~~(1,31)~~ for communication purposes with the aid of at least three impedances ~~(9)~~ and test signals ~~(vt_{in};vt_{out})~~ the impedances ~~(9)~~ having each a predetermined value and being connected to the line connection ~~(5)~~ of the test transceiver ~~(1,31)~~;

- the measurement device ~~(32)~~ being arranged to generate a frequency dependent echo transfer function ~~$(H_{echo}(f))$~~ for the test transceiver ~~(1,31)~~ connected to the respective one of the impedances ~~(9)~~;

- the measurement device ~~(32)~~ being arranged to generate transceiver model values ~~$(Z_{h0}(f), Z_{hyb}(f), H_{\infty}(f))$~~ with the aid of said echo transfer function ~~$(H_{echo}(f))$~~ and the corresponding impedance values ~~(9)~~, said model values including an echo transfer function ~~$(H_{\infty}(f))$~~ for the transceiver ~~(1,31)~~ with open line connection ~~(5)~~, a transceiver impedance value ~~$(Z_{hyb}(f))$~~ as seen from the line ~~(2)~~ side and a product of said transceiver impedance value ~~$(Z_{hyb}(f))$~~ and an echo transfer function ~~$(H_0(f))$~~ for the transceiver ~~(1,31)~~ with shortcut line connection ~~(5)~~; and

the transceiver for communication purposes ~~(1,31)~~ being arranged to generate the frequency dependent line input impedance ~~$(Z_{in}(f))$~~ with the aid of the transceiver model values ~~$(Z_{h0}(f), Z_{hyb}(f), H_{\infty}(f))$~~.

12. (Currently Amended) An arrangement for generating properties of a signal line ~~(2)~~ according to claim 11, the arrangement including a memory ~~(12,33)~~ for storing the transceiver model values ~~$(Z_{h0}(f), Z_{hyb}(f), H_{\infty}(f))$~~.